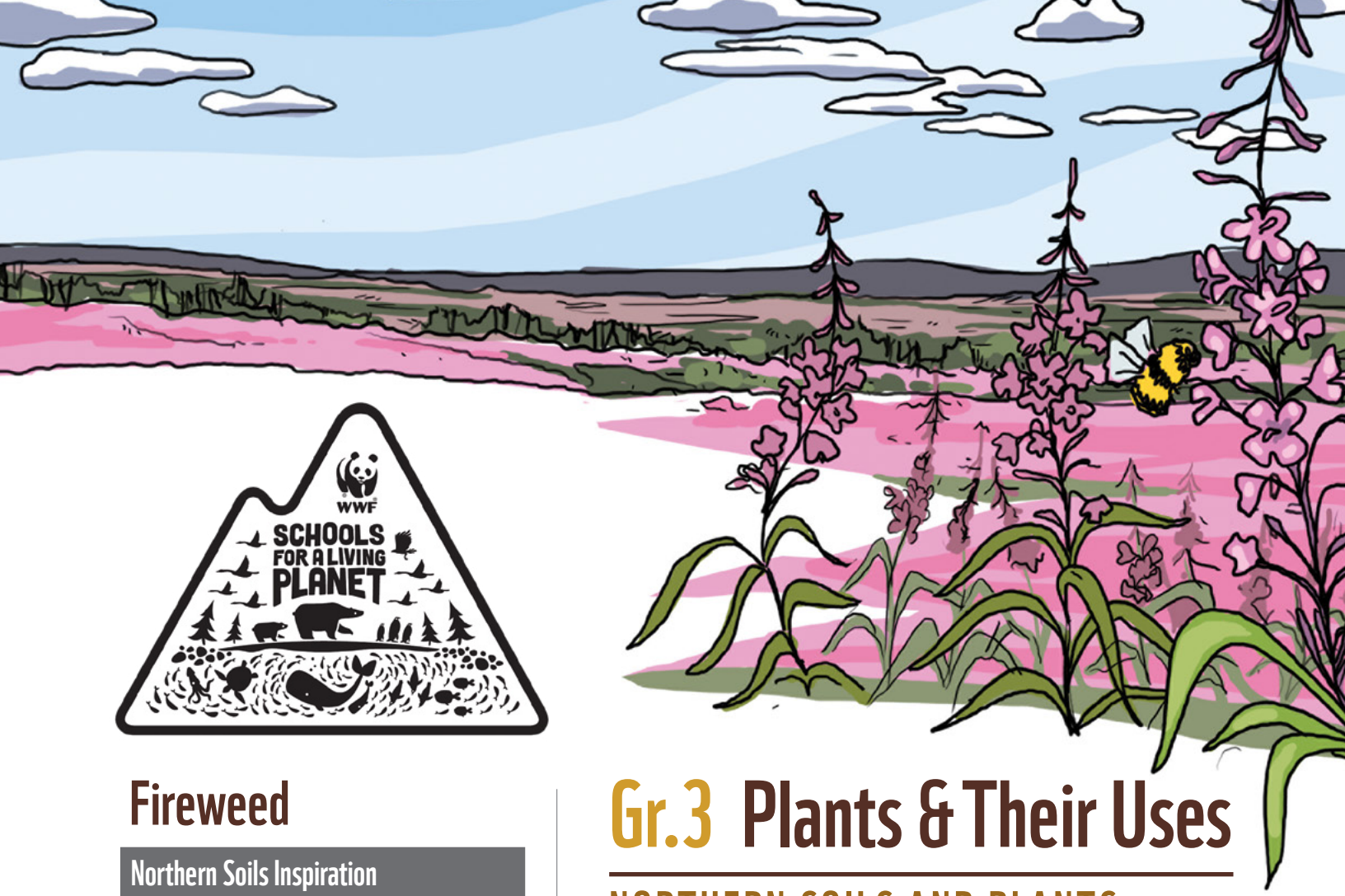


Fireweed

Northern Soils Inspiration

Although fireweed seeds are tiny, they grow into one of the tallest wildflower plants found in Nunavut. This plant is also called Dwarf Fireweed and River Beauty Willowherb. Different parts of the plant (shoots, leaves, blossoms and seeds) can be used for a variety of purposes. This hardy and tenacious wildflower adds a vibrant splash of color and beauty to the landscape of Nunavut.

SMART Board / Promixa Ready

Northern Resources

Gr.3 Plants & Their Uses

NORTHERN SOILS AND PLANTS

OBJECTIVE Students will learn about the characteristics of northern plants that are adapted to our extreme conditions. Students will also gain a better understanding of the importance of northern plants to animals and people.

Nunavut covers over 1, 900 000 km^2. Within this territory there is a limited variety of soils and approximately 250 plant types. All communities are found above the tree line in areas with very shallow organic soil layers. This is due in part to the effect of glaciers that scraped away much of the organic soils, exposing the Canadian Shield. In each region of Nunavut, plants have adapted to the acidic soil conditions and brief, yet intense growing seasons. Without plants, there would be no large or small animals such as caribou, moose, ptarmigan, snowshoe hare, geese or bear.

CURRICULUM Links

The activities and resources in this document are intended to tie in with Grade 3 science curriculum *Life Systems - Growth and Changes in Plants*, as well as the *Inuuqatigiit* curriculum relating to the land. In addition, the science curriculum supports the Pan Canadian Protocol Collaboration on School Curriculum. You can find specific learning outcomes for each of these by following the links below. If you're not already familiar with the Inuuqatigiit curriculum it's a good idea to take a look because it contains a lot of useful advice about bringing northern culture, language and traditional knowledge into the classroom. Here are some examples of where the lessons in this resource connect with these different curricula. Some suggestions for making connections have been included in the lesson plans.

© Zoe Caron / WWF-Canada

Traversing across the rocky landscape on Digges Island, Nunavut, Canada

Grade 3 Science

General Learning Outcome

By the end of Grade 3, students will describe ways in which plants are important to other living things and the effects of human activities on plants.

Specific Learning Outcomes

Students will classify plants according to visible characteristics (e.g., bark, leaf shape, root systems, type of flower, seed or berry)

Connected Lesson

Lesson 1 - Evergreen Explorations

Covers the differences between leaf types and what this means for the lifecycle of the plant, including an experiment demonstrating the water-retaining properties of needles vs leaves.

Related Experiences

While out on the land for picnics (in the fall), choose one or two plants that children can collect for cooking (K-4)

Connected Lesson

Lesson 2 - Plant Postcards

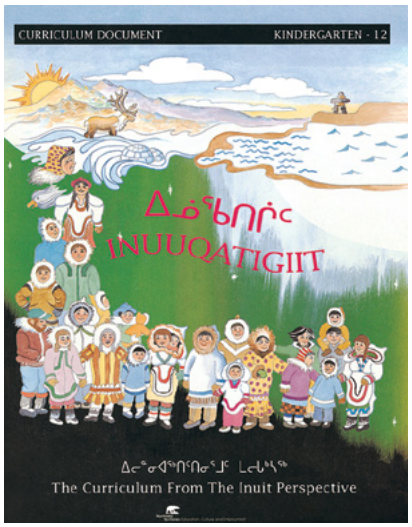
Creating plant postcards provides an opportunity to get out of the classroom and look closely at trees. Elders could also be invited to talk about traditional uses.

CURRICULUM Links

Inuuqatigiit - Plants

General Objectives

Students will appreciate the many uses of plants and the importance of plants to Inuit. Students will hear stories about plants and their uses. For example, in the past, moss was used for diapers, mattresses and still is used as a fire starter today when out on the land.



Key Experiences and Activities

Invite Elders to tell stories about plants and their importance to Inuit. Have students make gifts from plants and give them to the Elders.

Connected Lesson

Lesson 5 -
Traditional Uses for Plants

Plan a class field trip to the tundra with an Elder as a guide. The focus should be on identifying local plants and their traditional uses.

This resource, **The Elders in Schools Handbook,** provides valuable information about inviting Elders to contribute to lessons and related activities. Interview templates are included as well as practical advice about compensation (See **Teacher's Resources**).

JOURNALS

Tundra vegetation in Hudson Bay, Nunavut, Canada.

Soil and Plant Field Journal

Students can design their own journals for recording observations and questions as they explore the soil types and plants around them. Keeping a field journal helps develop scientific inquiry and research skills. Journals can be simple homemade books with lined pages or sections for note taking and plain sections for sketching. It's also a good idea to reinforce some or all of the pages with card so that they'll be strong enough to have things like twigs, leaves or even little plastic bags containing soil samples stuck to them.

Great Stems has an excellent step-by-step guide to making nature journals. You can find the link in the **Teacher's Resources** section.

Assessment Tools

Journals can be used as assessment tools for almost all of the lesson ideas in this resource. Some suggestions for how to use them have been included. For students who need help writing their ideas, consider pairing them with a student who can scribe for them, allow them to complete their notebook on the classroom computer or create a video blog.

TEACHER'S Resources

Books

Barrenland Beauties Showy Plants of the Canadian Arctic
Page Burt
Outcrop Ltd, 1991
ISBN 978-0919315259

Harvesting the Northern Wild: Edible Plants and Recipes
Marilyn Walker
Outcrop Ltd & Cornell University, 1984
ISBN 978-0919315105

Living in the Taiga
Carol Baldwin
Heinemann, 2009
ISBN 978-1403429940

A Walk on the Tundra
Anna Zeigler & Rebecca Hainnu
Illustrated by Qin Leng
Inhabit Media, 2011
ISBN 978-1926569437

Windowsill Science Centers
Lynne Kepler
Scholastic Canada, 1996
ISBN 978-0590743952

Plants and Animals of the North
Heather Kissock and Leia Tait
Designer: Terry Paulhus
Weigl Educational
Publishers LTD. 2010
ISBN: 978-1553889649

Blackberry Banquet
Terry Pierce
Illustrator: Lisa Downey
Sylvan Dell Publishing. 2008
ISBN: 978-1934359709

The Potato King
Christoph Niemann
Illustrator: Christoph Niemann
Owl Kids Books INC. 2015
ISBN: 9781771471398

Rosie Sprout's Time to Shine
Allison Wortche
Illustrated by Patrice Barton
Random House, 2011
ISBN: 978-075867217

A Seed Is Sleepy
Dianna Hutts Aston
Illustrated by Slyvia Long
Chronicle Books
ISBN: 978-0811855204

Musk Oxen

Roman Patrick
Illustrated by Thomas Kitchen
Gareth Stevens Publishing, 2011
ISBN: 978-1433939020

TEACHER'S Resources

Websites

Botanists to collect plants from far northern land

Lynn Desjardins
Radio Canada International
www.rcinet.ca/en/2014/06/29/botanists-to-collect-plants-from-far-northern-land/
This podcast documents the efforts of scientists to catalogue plants in a remote area of Nunavut with a view to understanding changes to the northern and Arctic flora stimulated by climate change.

Northern Farm Training Institute

www.nftinwt.com
The Northern Farm Training Institute works towards food production and sustainability in the North. Provides education about composting, planting, harvesting, permaculture and animal husbandry through workshops and internships.

Printable Materials

Agriculture in the Classroom

www.farmnwt.com
Teaching Guide and Resource written by the Territorial Farmer's Association - Hay River, NT, 2014. This is an excellent resource all about growing food in the North! You can also contact the Territorial Farmers Association for advice at (867) 874-4706.

Elders in Schools Handbook

www.ece.gov.nt.ca/files/publications/elders_in_schools_handbook_en_web.pdf
This resource provides valuable information about inviting Elders to contribute to lessons and related activities. Interview templates are included as well as practical advice about compensation.

LESSON Plans

Introductory Lesson

1 class period. No formal assessment.

If possible, project the following student text on a smart board or proxima projector. It may benefit some students to follow along on a print copy, which they can then highlight. Read the text as a class.

Discussion Guide

Can your class list the ways your community uses the plants from the tundra?

- Plants for fire and traditional lamps
- Source of ingredients for traditional medicine
- Habitat for animals
- Source of food (i.e. mushrooms, berries, roots and shoots)

Inuuqatigiit Connection

Review the table of curriculum connections and plan a visit with an Elder or parent who can take your class out on the land. As a class, decide which activities they are most interested in learning more about and incorporate that into your cultural programming.

Lesson 1: Evergreen Explorations

1 class period.

This activity is adapted from the book **Windowsill Science Centers** (see **Teacher's Resources**) and can be done in groups or individually. It shows how plants with evergreen leaves preserve moisture. Students can note their predictions in their plant journals.

You'll need: Two paper towels, one sheet of waxed paper (same size as paper towels), two plates, and some water.

Method

1. Explain to students that they will be learning how evergreen shrubs preserve water compared to deciduous shrubs.
2. Ask each group to wet the paper towels and squeeze out the excess moisture.
3. Lay one paper towel out flat on a plate.
4. Lay the other paper towel flat on waxed paper. Roll it up with the waxed paper on the outside and place it on the second plate.
5. Ask students to predict what will happen to each paper towel if left overnight.
6. Next day, look at the paper towels. Students can unroll the paper towels in wax paper.
7. If students' results are different, talk about what might have caused that difference.
8. *Can they make connections between the two paper towels and the type of leaves they represent?* Deciduous shrubs' leaves fall off otherwise they would lose too much moisture through evaporation. Evergreen shrubs retain their moisture through their waxy leaves. This helps them survive.

Assessment

Ask students to record their predictions and connections in their plant journals.

PLANTS in the North

*Flowers, **lichens**, spruce trees, mosses, reeds and willows: what do these things have in common? They are all northern plants!*

The **taiga** and the **tundra** are the main **ecosystems** in Nunavut. The taiga is a northern forest covered by coniferous trees, lakes and bogs. **Coniferous** trees have needles that use the energy from the sun and water from the ground to keep the tree alive through all the seasons. Their **needles** are waxy to hold water even in the cold dry wind. Conifer seeds stay inside **cones** until a forest fire pops them open and gives them a chance to grow. Nunavut has only a small portion of taiga forest located at the "four corners" where Nunavut meets the boundaries of the Northwest Territories, Saskatchewan and Manitoba.

The tree line marks the limit where trees from the taiga stop growing. The tundra starts at the tree line and extends all the way to the Arctic Ocean. There are no trees on the tundra. In the winter, it looks like a desert of snow, and in the summer the tundra blooms into a patchwork of beautiful colours. Lichens and mosses grow on the tundra soil, as well as flowers, mushrooms and all sorts of plants.

It is also possible to use trees to make tools and construction materials. In southern Canada, people make a living logging trees. They send them to mills that transform the logs into useful products. Think about the ways you use trees every day: you are looking at a tree product right now! Paper, fabric, wood and many foods come from plants.

An Arctic hare *(Lepus arcticus)* with white coat rests on tundra, Ellesmere Island, Nunavut, Canada.

The midnight sun setting at 2am over the Baillie River in the Thelon Wildlife Sanctuary, Nunavut, Canada.

LESSON Plans

Lesson 2: Plant Postcards

1 class period.

You'll need paint, colouring pencils and white cardboard cut approximately the size of a postcard.

Have students create a postcard-style drawing or collage to represent a local plant. On the reverse side, students can write interesting facts about the plant, how it is adapted to survive in the northern climate and any traditional uses. Ideally, it should be addressed to someone in a different geographical area of Canada. The goal is to share the information with someone who might want to learn more about northern plants. *Perhaps your class is "twinned" with another school in a different part of Canada or a different part of the world?* Use those connections for this project. The World Wildlife Fund can help you pair your class with a school in southern Canada. For more information please contact ca-panda@wwfcanada.org.

Assessment

Photograph or photocopy the postcard (both sides) and ask students to attach it in their soil and plant field journal. Bonus - if the class gets partnered with a school in southern Canada they can also add in the postcard they receive!

PlantWatch North field book. Contact Ecology North for more information.

Lesson 3: PlantWatch North

1 class period - with opportunities to revisit the lesson throughout the spring.

Plantwatch North is a regional branch of PlantWatch, a national volunteer monitoring program that invites students to identify ecological changes related to plants in northern Canada. The **PlantWatch field guide** can be found in **Teacher's Resources**. This guide helps users to identify northern plants. Observations must then be submitted to PlantWatch. This type of science activity allows the students in the class to contribute valuable data to a national database. Researchers need to have more "citizen scientists". More information can be found at www.plantwatch.ca In addition, Ecology North has PlantWatch North posters that they can send out to your class - contact them through their website www.ecologynorth.ca.

Note: This is a springtime activity. You can adapt it slightly - and use the guide as a plant identification booklet if you are taking the students out in the fall or late spring.

Using the Plantwatch North guides for their region, ask the students to become familiar with the plants commonly found in the north. As a class, try to find plants that should be emerging from the ground or blooming within the first couple of weeks after snow has melted.

Put images of these plants on a board along with their common, scientific and other names. For example: Cranberry → *Vaccinium vitis-idaea* → lowbush cranberry, lingonberry, rock cranberry, mountain cranberry, partridgeberry → kinminak (Inuktitut) → airelle de montagne and canneberge (French).

Make it a competition: as the weather warms up, have students report their plant sightings on their way to and from school or over the weekend.

Assessment

Students record plant list in their soil and plant journals.

Lesson 4: The Life of a Seed

1 - 2 class periods - Language Arts Activity.

Have students pick a local plant from their plant guides. Students must answer the following questions about their plant species:

1. *Where does the plant grow (in a bog, in the taiga, on the tundra, etc.)?*
2. *What do the seeds look like?*
3. *How are the seeds transported (on animal fur, wind, water, forest fire, etc.)?*
4. *What does the plant look like?*

Using their answers to the questions above, students must write a story from the plant's point of view. Begin with its birth (seed is released from the parent plant) and childhood as a seedling, following as it moves away from home (transport of the seed by animal, water or wind) and finds a new place to live (growing into adulthood). Students should also explain how the plant spreads its seed and starts a new family (generation). Students can share their stories with the class. Encourage creativity and humour!

Assessment

Students include a copy of their story in their soil and plant journals.

Arctic willow showing its seeds.

LESSON Plans

Lesson 5:
Traditional Uses for Plants

2 - 3 class periods.

Traditional knowledge (TK) is shared to encourage students to learn how Aboriginal people make the most of the plants available to them. Invite a member of the community who has this knowledge to speak to the class, or plan a field trip to the tundra with an Elder as a guide. The focus should be on identifying local plants and their traditional uses. Some Elders specialize in sharing their knowledge of traditional medicine, which uses a wide variety of plants for a number of common ailments.

Opportunity

Students can write their answers to the plant matching game in their soil and plant journal.

Cultural Connection

Inuuqatigiit

Have students collect Labrador tea and fireweed flower pods. It's very important to never take more of the herbs, plants, roots than you need. Also only trained people should use plant medicines because certain plants can be poisonous and can cause you harm if you use them incorrectly. Set aside a class period to create something using what you have collected. Be creative!

Assessment

Students can write their answers to the plant matching game in their soil and plant journal.

Plantwatch

Check out this article about gathering Nunavut plants.

Print this chart and cut the words into strips. Challenge students to match the traditional use with the correct plant!

Traditional Use	Plant
Silky plumes used in Iqulliq (traditional lamp)	Arctic Cotton
Leaves for tea, can also eat flowers and leaves	Fireweed
Tea	Labrador tea
Traditional bedding material	Arctic Heather
Decorating ceremonial clothing	Cranberry
Black, plump berries for eating	Crowberry
Official territorial flower	Purple Saxifrage
Salad greens	Dandelion

WILD Ideas

Gardening above the 60th parallel

The Iqaluit Community Greenhouse Society (ICGS) was established in 2001 to research ways that the community could improve food security. Food security happens when all people, at all times, are able to get enough safe and nutritious food to meet their needs. The high cost of food in northern grocery stores causes food insecurity for many people. In 2007, after several years of fundraising, the ICGS built a greenhouse and they have been growing and providing education about northern agriculture ever since! Contact ICGS for more information on arranging a tour.

Iqaluit Community Greenhouse Society president Steve Leyden with early summer growth

Make a terrarium in the classroom!

A terrarium, in case you don't already know, is a tiny self-contained indoor garden. Click here for some simple instructions on how to make one.

How to Make a Terrarium

Research locally grown food initiatives in the North!

Research how communities are trying to overcome the high cost of fresh food through community garden initiatives and greenhouses. You could ask your students to make profiles of projects with pictures and some statistics. Contact the Territorial Farmers' Association (www.farmnwt.com) for advice on how to get started.

Glossary

Nunavut has two official languages: Inuktitut and Inuinnaqtun. Inuvialuktun is used in some parts of western Nunavut. Languages develop over thousands of years and they tell us a lot about the people who speak them and the environment that they live in. You've probably heard that Inuit have many different words for snow. This is because there are many different types of snow in the Arctic and knowing the difference between them and what they can be used for at one point in time would have meant the difference between life and death. We asked speakers of some of these languages to translate some of the key words in these resources and provide literal back translations. You'll see that some words translate easily while some require very long explanations. The same is true when trying to translate from Aboriginal languages into English and French. There are many words that have no translation. Try using these translations to have a conversation with your students about the differences between languages and how they reflect different ways of life and ways of thinking. This would be a great opportunity to invite a native language speaker into the classroom too.

Fireweed

A common plant in the boreal forest with purple flowers

Inuvialuktun	**Nautchiaq tunguqtaaq** / Purple flower

Lichen

A plant type organism made of algae and fungi living together

Inuktitut	**1. Tuktuit niqingi** / Caribou fodder / **2. Tingiujait (most common term)** / More accurately explains the appearance in that is similar to pubic hair that grows on land or rocks
Inuvialuktun	**Tuktuum niqiat** / Food for caribou
Inuinnaqtun	**1. Qavviqqut** / Lichen on a rock / **2.Tuktup niqautaa** / Lichen on the ground

Glossary

Taiga

A northern forest where the trees are mostly coniferous trees

Inuvialuktun	**Napaaqtuq** / Tree
Inuinnaqtun	**Napaaqtuqangniq** / Where there are a lot of trees

Tundra

A treeless area in the North

Inuktitut	**Nuna** / Land
Inuvialuktun	**Nunavik** / No trees
Inuinnaqtun	**Ukiuqtaqtumi nuna** / Land where it is always winter

Ecosystem

An area where plants and animals depend on each other to survive.

Inuvialuktun	**Nunaami nautchuutlu niryunlu inuuyuaq** / On the land plants and animals survive
Inuinnaqtun	**Avatiqaqatigiinngniq** / Things that share their surroundings

Coniferous

A tree that produces cone seeds

Inuvialuktun	**Napaaqtuq** / Tree

Glossary

Needles

The thin leaves of coniferous trees that stay on the tree all year.

Inuktitut	**Miqqutingit** / Needles of the tree
Inuvialuktun	**Ipiktuq napaaqtuq quraq sivituyumik** / Sharp needles on a tree that grow for a long time
Inuinnaqtun	**Napaaqtup atungauyait tuatpiaqtut ukiuraaluk napaaqtumiitut** / Very thin leaves on a tree that stay on the tree year round

Cones

The seeds of a coniferous tree

Inuktitut	**Napaaqtuksait** / Items that grow into trees
Inuvialuktun	**Napaaqtuut nakaaq** / Food that is part of the tree

Berries

Soft small fruits that contain many small seeds

Inuktitut	**Paungait** / Berries
Inuvialuktun	**Asiaq**
Inuinnaqtun	**Kablat** / Berries

Glossary

Root

The part of the plant that gets water and nutrients from the soil

Inuktitut	**Airait** / The bottom parts of plants inside the land
Inuvialuktun	**Masu**
Inuinnaqtun	**Airaq** / Roots

Seaweed

Plants that grow underwater

Inuktitut	**1. Qiquat** / Seaweeds in general / **2. Kuanniit** / Seaweed that is edible for humans
Inuvialuktun	**Nakaaq imaq iluani** / Plants underwater
Inuinnaqtun	**Aqaya**

Sap

A fluid produced inside plants and trees.

Inuvialuktun	**Uummaq**
Inuinnaqtun	**Napaaqtuupuqhua** / The fat of a tree

URLs

Some hyperlinks have been embedded throughout this resource. If a link appears to be broken, try visiting the homepage or keying in the URL as it's written below.

Grade 3 science curriculum
http://www.ece.gov.nt.ca/files/Early-Childhood/K-6%20Science%20%26%20Technology%20CurriculumFINAL%20.pdf

Inuuqatigiit curriculum
http://www.ece.gov.nt.ca/early-childhood-and-school-services/school-services/curriculum-k-12/aboriginal-languages#inuuqatigiit

Agriculture in the Classroom
http://www.farmnwt.com

Elders in Schools Handbook
http://www.ece.gov.nt.ca/files/publications/elders_in_schools_handbook_en_web.pdf

How to make a terrarium
http://www.wikihow.com/Make-a-Terrarium

Territorial Farmer's Association
http://www.farmnwt.com

Gathering Nunavut plants:
http://www.canadianliving.com/food/cooking_school/cross_canada_cooks_nunavut.php

Iqaluit Community Greenhouse Society
http://iqaluitgreenhouse.com/

WWF is working to build a future where people live in harmony with nature. The Schools for a Living Planet program empowers educators and students of all ages with the tools they need to lead us into a sustainable future. Schools for a Living Planet is grounded in the principles that make WWF a global success - including strong science and a focus on solutions.

Ecology North is a charitable, non-profit organization that has engaged Northerners in hands-on learning opportunities in the Northwest Territories since 1971. Our mission is to bring people and knowledge together for a healthy Northern environment. Education, public engagement and youth involvement are integral to all of our program streams that include climate change adaptation, watershed protection planning, waste reduction, food sustainability and alternative energy promotion.

This project was made possible with the financial support of CIBC.
For more information, visit www.cibc.com.

WWF-Canada and Ecology North would like to thank the classroom teachers across Nunavut and the Northwest Territories who contributed many of the ideas presented here, especially Paul Strome, Marlene Martin, Megan Miller and Michelle Wright. Ecology North Education Committee members Marianne Bromley and Mindy Willet also provided guidance. This resource is available as a free download from WWF-Canada Schools for a Living Planet. Visit schools.wwf.ca.